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COMPLETE SPECIFICATION

Buffing and Polishing Compositions and Method of Preparation

We, POOR AND COMPANY, a corporation of the State of Delaware, United States of America, having its place of business at Railway Exchange Building, Chicago, 4, Illinois, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to buffing and polishing compositions and is more particularly concerned with binders used therein and the method of preparation thereof.

Buffing and polishing compositions ordinarily contain one or more abrasives such as silica, quartz, aluminum oxides, silicon carbides, ferric oxide, chromic oxide, emery, tripoli, pumice, barytes and other abrasives in combination with a suitable carrier or binding material. Some of these carriers may be in solid form such as a bar or cake, while others may be in a liquid form for application to a buffing wheel. When the composition of the abrasive and carrier is in the form of a bar, the carrier is usually known as a binder and the abrasive is applied to the buffing wheel by holding one end thereof against the wheel while it is rotating at high speed. The heat generated by the resulting friction causes the binder to melt and part of it, together with the entrained abrasive is transferred to and retained on the buffing wheel. In order to accomplish this result, it is necessary for the melting point of the binder material to be within a suitable range so that the friction set up between the buffing wheel and the bar will be sufficient to melt the binder and cause an adequate amount of it to become attached to the wheel. The material to be polished or buffed is then held against the rotating wheel and the desired action is effected by the abrasive coming into contact with the article.

An additional method of applying the abrasive to the wheel is to incorporate it into a suitable liquid carrier which is sprayed against the wheel or applied thereto in some other suitable manner, after which the actual polishing or buffing operation is performed as described above.

In carrying out the buffing and polishing operations as set forth, the binder material or liquid vehicle employed to carry the abrasive to the wheel, has produced films on the material being operated on which are difficult to remove. The types of material used for this purpose have included a large number of different substances such as waxes, tallows, stearic acid, rosin, paraffin, oleic acid, petrolatum, lanastear (a form of wool fat acid) and other materials and combinations thereof, combined in suitable proportions to yield a final product having the required properties. The films must be removed in order to further process the buffed and polished material, particularly where subsequent electro-plating processes are to be employed. The usual methods employed to remove the unwanted film include subjecting the buffed objects, which may be iron, steel, brass, aluminum, chromium, etc., to alkali treatments such as with caustic soda and to other chemical solutions for the purpose of saponifying and emulsifying the ingredients of the films and to effect a reaction that will result in the liberation of a gas about the object that has been subjected to the buffing action. This results in a scrubbing action such as is secured in electro-cleaning. This is followed by thorough rinsing and frequently by other chemical dips to obtain a clean surface.

Such cleaning operations are very laborious and time consuming. Moreover, the use of these severe chemical treatments necessary to remove some of these films tends to cause injury to the

surface of the metal and frequently results in discoloration, etched surfaces and other unwanted effects, thereby significantly reducing the quality of the product and making it difficult to obtain a satisfactory electro-plated surface thereon.

It is the object of this invention to provide binders and liquid vehicles for abrasive particles which are easily removed from surfaces of metals by a mild alkali treatment, which may be removed in much shorter time than binders and vehicles of the prior art, and which minimize the use of injurious chemicals to so remove them.

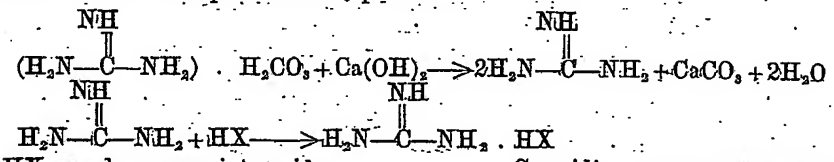
In providing such binders and vehicles, it is also important for them to have suitable lubricating characteristics. The lubrication properties should be such that a sufficiently smooth or slippery condition is provided which decreases the friction between the moving surfaces thus reducing the tendency to burn and facilitating the presentation of the abrasive particles in such a way as to secure their optium action.

Accordingly, it is a further object of this invention to provide binders and vehicles of the type mentioned, having suitable lubricating characteristics and those which also may be varied to accommodate different types and sizes of abrasives which are used in the art. In this invention, there has been produced a specific type of soap (guanidine) which is better than the soaps heretofore produced and prepared in such a manner as to make it easier to remove the residue film which is always present on the surface of the objects that have been buffed. The soap itself is a lubricating compound.

We have found that soaps generally characterized as guanidine soaps are especially suitable for this purpose, for example, guanidine laurate, guanidine myristate, quanidine palmitate, guanidine stearate, guanidine oleate, guanidine linoleate, guanidine linoleneate and other soaps of the guanidine series. The term guanidine throughout this specification includes guanidine and its hydrocarbon substitution products. In accordance with this invention, particles of the desired abrasives are mixed with these soaps to which may be added other suitable materials to vary the factors of lubrication, melting point, dryness, etc. In the case of binders, a melting point above room temperature is used, while a melting point below room temperature is used in the case of a liquid vehicle. Specific melting points for any particular conditions desired may be attained by varying the ingredients and proportions thereof.

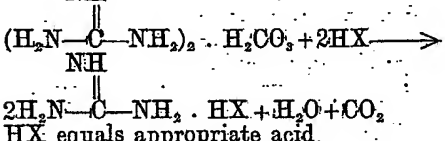
Suitable methods of preparing the soaps of this invention are as follows:—

1. By first preparing free guanidine in solution and then a subsequent reaction with the appropriate acid as indicated in the following equation:



HX equals appropriate acid.

2. By reacting guanidine carbonate directly with the fatty acids—double decomposition.



HX equals appropriate acid.

While either of the above methods may be used, we prefer to react the guanidine carbonate directly with the fatty acids.

There are also other salts of guanidine and its hydrocarbon substitution products which are available such as guanidine nitrate, guanidine hydrochloride and phenylguanidine carbonate. However, the guanidine carbonate is best suited because of price, availability and because it is most satisfactory from a reaction standpoint.

Guanidine soaps as formed above have great emulsifying powers, in some instances superior to corresponding sodium and potassium soaps and under specific conditions they are more efficient emulsifying agents than many corresponding amine soaps. In this respect, they are particularly suitable for the purpose of this invention because of their emulsifying action on the waxes, natural and synthetic, which are widely used in binders, thus rendering them more readily removable from the work.

Also, these guanidine soap-wax emulsions form a very satisfactory vehicle for the production of abrasive compositions in a liquid or paste form.

A practical method of preparing the soaps of this invention and one which is relatively inexpensive, comprises reacting a guanidine salt such as guanidine carbonate, with suitable acids of the type mentioned or with materials containing

them. A cheap source of material for such acids is generally known as tank bottoms and consists of the residue of the distillation process for the production of stearic acids from fats and oils. Such tank bottoms contain a variety of suitable acids and the resulting composition after the reaction contains a number of different guanidine soaps. To the resulting soap composition may be added any suitable materials such as petrolatum and other similar materials, to alter the characteristics heretofore mentioned.

The following examples illustrate the manner of preparing suitable compositions in accordance with this invention, but it is to be understood that the invention is not limited thereto:

SOLID OR BAR TYPE COMPOSITION

EXAMPLE 1.

258 gr. of tank bottoms and 12 gr. of petrolatum were melted and thoroughly stirred together. Then 30 gr. of guanidine carbonate were stirred in and the heating continued until the reaction between the guanidine carbonate and the other ingredients was completed, which was indicated by the fact that no further gas bubbles were formed from the reaction.

While hot, 700 gr. of a finely divided abrasive was slowly added to the melted mass, the while stirring. The resulting material was then poured into forms and permitted to cool.

The resulting bar had excellent properties and was easily removed from the surface of the particles contacted therewith by use of mild reagents.

EXAMPLE 2.

200 gr. of oleo stearine, 40 gr. of double-pressed stearic acid and 10 gr. of guanidine carbonate were melted together and heated at reaction temperatures as evidenced by the production of small bubbles presumed to be carbon dioxide. When reaction was completed, 690 gr. of a finely divided abrasive was slowly added to the hot mass and stirred therein. The resulting mixture was then poured into forms and permitted to cool.

The composition of this material was found to produce a minimum amount of film formation which was readily removable and to have satisfactory lubricating qualities.

LIQUID TYPE ABRASIVE COMPOSITIONS

EXAMPLE 3.

Motor oil (SAE 30)	4 pounds, 11 ounces
Water soluble oil—a grade of oleic acid	3 pounds, 2¼ ounces
Guanidine carbonate	1 pound, 8¾ ounces
Water	2 gallons.
Abrasive (in finely divided form)	18 pounds, 12 ounces.

The above ingredients were incorporated and thoroughly mixed together. The resulting composition was a heavy liquid slurry which was applied in liquid form by spraying on a buffing wheel. It was found to produce results comparable to those obtained with the use of some solid bar compositions.

EXAMPLE 4.

A composition similar to that in Example 3 was prepared using 10% mineral oil, 6.7% of a water soluble oil (a grade of oleic acid) 3.3% guanidine carbonate, 40% water and 40% of a finely divided abrasive.

EXAMPLE 5.

Similar to Example 3, employing the following ingredients:

Water soluble oil (a grade of oleic acid)	50%
Twitchell oil No. 262	20%
Guanidine carbonate	5%
Kerosene	12.5%
Motor oil	12.5%

EXAMPLE 6.

Similar to Example 3 using the following ingredients:

Water soluble oil (a grade of oleic acid)	35%
Guanidine carbonate	5%
Twitchell oil No. 262	10%
Kerosene	50%

In each of the above examples the ingredients are all incorporated in the proper sequence and thoroughly mixed together. The viscosity can be varied by changing the amounts of water or kerosene as required in the respective formulæ to secure a suitable consistency for satisfactory application to the wheel by spray gun.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A buffing and polishing composition comprising an abrasive in finely divided form admixed with a vehicle therefor, said vehicle comprising essentially a guanidine soap.

2. A buffing and polishing composition comprising an abrasive in finely divided form admixed with a guanidine soap and a lubricant.

3. A buffing and polishing composition comprising an abrasive in finely divided form admixed with a guanidine soap and petrolatum.

4. A buffing and polishing composition

comprising an abrasive in finely divided form admixed with guanidine stearate.

5. A buffing and polishing composition comprising an abrasive in finely divided form admixed with guanidine oleate.

6. A buffing and polishing composition comprising an abrasive in finely divided form admixed with guanidine palmitate.

Dated this 15th day of November, 1949.

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